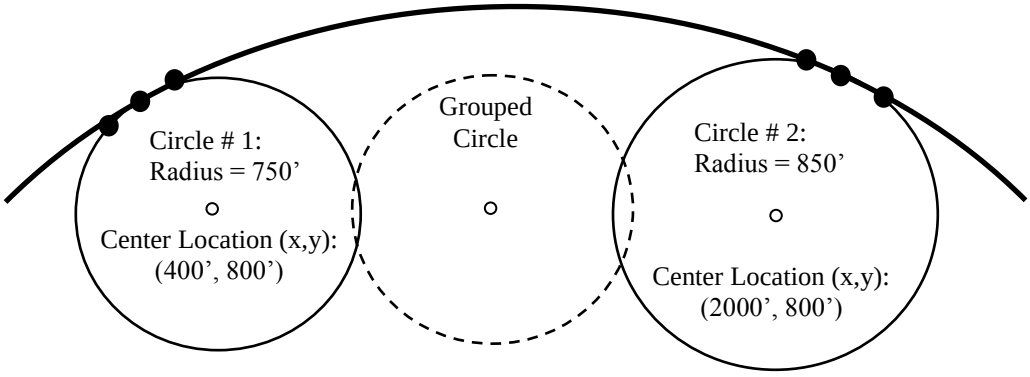
conditions, based on previous research by Rasdorf et al (2010). Although Curvature Extension was found to be more accurate, the average difference between Curve Calculator and Curvature Extension values for radius and length were approximately 0.5%.

Radius Analysis

The error quotient is a value calculated in Curve Finder that expresses how well a curve is defined. The quotient was designed to ensure that a particular curve was not combined with either of its neighboring curves. Every three GIS points have the potential to form a circle depending on the user's input for tolerance. A series of individual circles can be combined to form a larger system of circles which defines the curve. The parameters of the system of circles, the curve, are determined by averaging the parameters of the individual circles. The error quotient is calculated by determining the average of the distance from the center of each circle to the center of the overall grouped circle and dividing by the overall radius. Therefore, an ideal error quotient is zero, which implies an exact fit of individual and grouped circles. Equations shown with Figure 18 provide the basis for the error quotient calculations. Figure 18 provides an example diagram expressing the error quotient parameters. From this example, the grouped circle radius can be calculated by averaging the two radii from the individual circles for a radius of 800 feet. The location of the center of the grouped circle is determined by the average x and average y location for the individual circles. In this example, the grouped circle will have a location in the x-direction of 1200' and in the y-direction of 800'. The average distance from the center of each circle to the center of the grouped circle is 800 feet, so the corresponding error quotient for this example is 1 (800 feet divided by 800 feet).



So the Error Quotient =
Grouped Circle x-coordinate = $G_x = (\sum C_x) /$ Number of circles (Equation 4)
Grouped Circle y-coordinate = $G_y = (\sum C_y) /$ Number of circles (Equation 5)
Grouped Circle radius = $G_R = (\sum$ Individual Circle radii) / Number of circles (Equation 6)
Average x-coordinate error = $Error_x = (\sum |G_x - C_x|) /$ Number of circles (Equation 7)
Average y-coordinate error = $Error_y = (\sum |G_y - C_y|) /$ Number of circles (Equation 8)
Error Quotient = $(Error_x + Error_y) / G_R$ (Equation 9)

Where,
C_x = x-coordinate for each individual curve
C_y = y-coordinate for each individual curve

Figure 18. Curve Finder Error Quotient Diagram